

# A Conceptual Framework of Engaged Digital Workplace Diffusion

Dinda Lestari, Sarifah Putri Raflesia, Kridanto Surendro

School of Electrical Engineering and Informatics

Bandung Institute of Technology

dinda.lestari@gmail.com, syarifahpr@gmail.com, surendro@gmail.com

**Abstract**---Digital workplace creates challenges to improve the way people do their business. By using it, the organization is able to collect, process, and provide data faster, share knowledge, enforce their employee to communicate and collaborate with any devices. Digital workplace can be enabled by implementing many recent technologies such as big data, cloud computing, search-based application, and internet connection. But in this paper, we argue that technology is not enough to help the organization to do its business and reach its goal. According to these arguments, we propose the conceptual framework of digital workplace diffusion. This conceptual framework integrates diffusion theory, user's engagement, and controls. Controls are contained IT governance, risk management, compliance. We believe that user engagement and control are one of the keys for successful digital workplace diffusion. User engagement measurement is able to show the degree of employees' understanding and acceptance to the digital workplace. Meanwhile, control is used to help the organization in managing, monitoring, ensuring the digital workplace is aligned to the requirements and regulations.

**Keywords**--- digital workplace; digital workplace diffusion; user engagement; technologies.

## I. INTRODUCTION

In information age, technology changes rapidly. It affects the way people work which becomes new challenge to begin improvement. The digital workplace is meant to be a virtual equivalent to the physical workplace [1] where employees can work anywhere by using any devices, share knowledge, and browse data faster. This idea is based on the used of several recent trends, Bring Your Own Devices (BYOD), Internet of Things (IoT), people-centric work methods, and analytics [2] which help employees to collaborate, do tasks, and activities effectively.

In this paper, we propose a conceptual framework to digital workplace diffusion. Beside adding the technologies and diffusion theory, we include user engagement-centric and controls in order to succeed well transformation

According to previous research, there is a positive correlation between full user involvement and participation with system success [3]. It becomes the reason for us to consider and focus on user engagement, we believe that the

more users engage, the more chance for digital workplace diffusion to be success.

## II. LITERATURE REVIEW

In this section, we will describe and discuss about related theories towards digital workplace diffusion.

### A. Digital workplace

Digital workplace is a coordination between technology, process and people [1]. Digital workplace enables employees to work effectively from anywhere, at any time, on any device, and it provides an internet-like participative mode and user experience no matter where their location [4].

Digital workplace creates employees' ability to do their job by collaborating, communicating and connecting with others [5]. To achieve this goal, we need technologies as support. Digital workplace is focused on developing an application for mobile environment. The integration of four technologies; mobile, big data, cloud computing, and search-based application enable us to achieve the desirable feature of digital workplace [6].

### B. Diffusion

Technological diffusion is defined as multi-stage process comprised of adoption which uses and widespread in corporation or society [7]. Roger describes diffusion as the process by which an innovation is communicated through certain channel over time among the members of a social system. Diffusion has four elements, (1) innovation, (2) communication, (3) time, (4) social system.

Innovation is as an idea, practice, or object that is perceived as new by an individual or other unit of adoption [8]. Innovation is about figuring out how to add value for an organization. Innovation is the act with idea and successfully bringing them to life to solve problem and create opportunities [9].

In order to introduce the innovation, we need communication channels. It defines as which media to transfer the messages from one individual to another in social system [8].

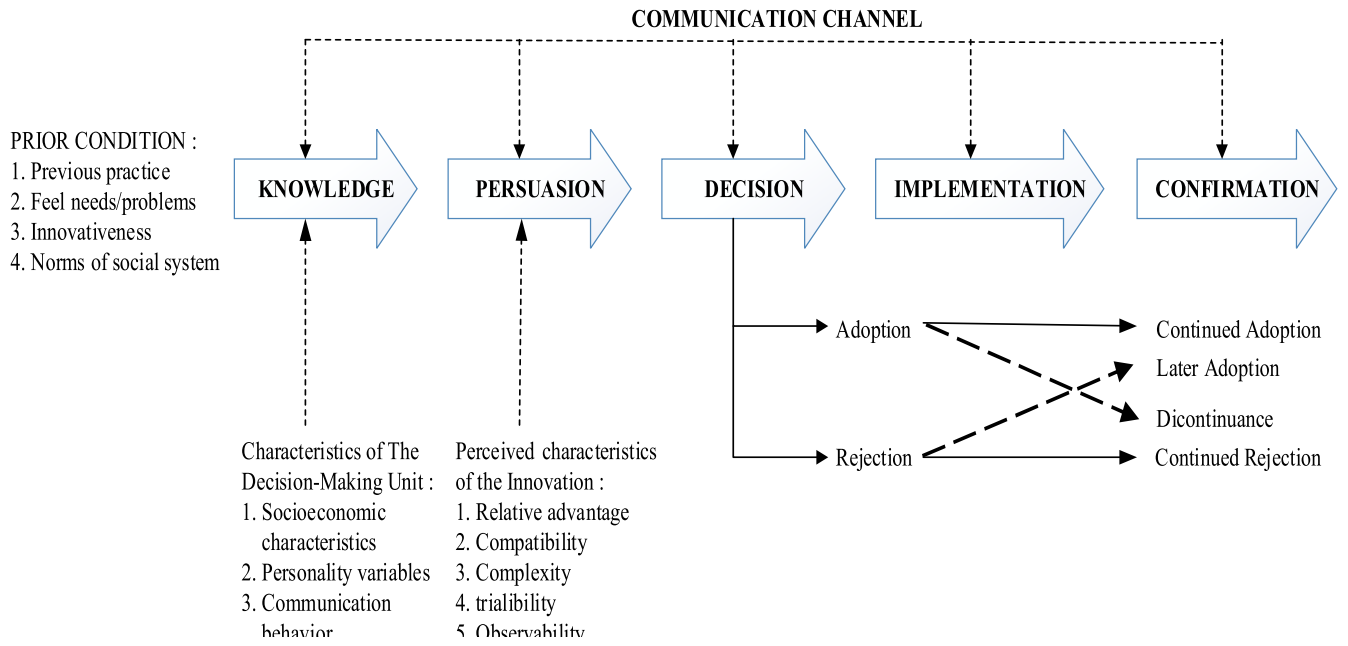


Fig. Innovation Decision Process [8]

The third element of diffusion is time. We can find time dimension of diffusion in the innovation-decision process. The innovation-decision process is essentially an information-seeking and information-processing activity in which the individual is motivated to reduce uncertainty about the advantages and the disadvantages of the innovation. Fig.1 shows five stages of innovation decision process[8].

The last element of diffusion is social system which defines as the environment where the diffusion occurs. The members or units of a social system maybe individuals, informal groups, organizations, and/or subsystems. Diffusion is a kind of social change because the decision to adopt or reject an innovation will lead to changes in structure and function of social system[8].

### C. User engagement

In order to engage digital workplace, we need to ensure that users are involved and participated. These are compressed as user engagement. User engagement is defined as the quality of the user experience that emphasizes the positive aspects of the interaction. It is not just about usability, but it also contains how users invest time, attention, and emotion when they are connected to the system [10]. It matters because it is related to the confirmation of adoption status. When a user is engaged, it means they will more understand about what they should do and they will admit the value of the whole system and there will be a chance to the innovation to be well adopted. User engagement has become an issue in the implementation of

IT. It is a cognitive aspect which represents of positive emotion like enjoy and willingness [11]. It will suddenly cause the internal satisfaction. According to previous research, user engagement has 6 attributes, focused attention, aesthetic, novelty, perceived usability, endurability, felt involvement [12]. Table 1 shows the list of engagement attribute and description. This attributes will be used to measure user engagement of digital workplace.

TABLE I. DESCRIPTION OF USER ENGAGEMENT ATTRIBUTES

Attributes	Description
Focused attention	The state of total absorption in situation, and full attention [13]
Aesthetics	Aesthetic is defined as the feeling of beauty when a user interact to the system[14].
Novelty	The feeling of surprise and excitement when interacting to interface [12]
Perceived usability	It is defined as the perception when system is not beautiful means the system is not usable. [15]
Endurability	This attribute is defined as the state when the system is worth to try again in the future [16]
Felt involvement	The feeling of self-relevance which affects attention [17]

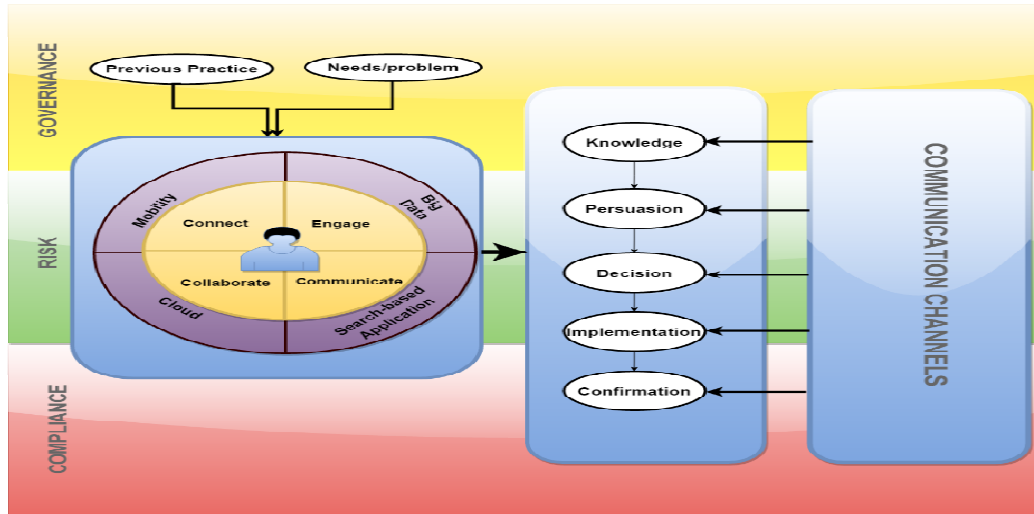


Fig.2. Conceptual framework of digital workplace Diffusion

### III. DESIGN OF CONCEPTUAL FRAMEWORK FOR DIGITAL WORKPLACE DIFFUSION

In this part, we will introduce the conceptual framework for digital workplace diffusion. As we can see fig.2, this model contains integration between diffusion theory, digital workplace concept, and user engagement. These two concepts lie on control which responsible to manage risks, compliance, run good IT governance along digital workplace diffusion.

#### A. Initial Stage

Before we decide to use the innovation, we have to identify where we are now. This activity enables us to define current status, future target, and how digital workplace helps the organization to reach its goal. The common reasons of digital workplace diffusion are awareness and organization needs. It is an awareness if the organization becomes more active in improving and monitoring the IT trends. In this state, the organization is more open to the digital workplace because it has advanced understanding to the advantage of implementing digital workplace.

Organization needs are caused by dissatisfaction to current practice. In this state, the organization will examine a new technology to fulfill its needs. Digital workplace diffusion enables the organization to improve the used of technology from a previous state to the desired state. It involves new technologies and employees' habits which are enable the core competencies of the digital workplace.

#### B. Digital Workplace Technology

Nowadays, many new technologies emerged to support business. Those technologies, such as cloud computing, big data, mobile, and search-based application, create an opportunity for organization to create a digital workplace.

Along with those technologies, we also need to consider business goal and capability of organization in order to build a digital workplace that can be accepted by employees and give a positive impact for organization.

Digital workplace is focused on developing applications in mobile environment. Cloud computing enables people to access data or application by using any devices which are already used by employee, such as PC, tablet or smart phone. It also enables people to connect and work together no matter where they are.

Organization also needs many data to support its business. These data comes from many different sources and in different formats. Big data helps employee to collect, process and visualize data faster. Given the amount of data involved, we need to develop search-based application in order to help employee access those data faster. Integration of those technologies will make a big improvement to organization's performance.

#### C. Innovation Decision Process

In this part, we will discuss about innovation-decision process. It contains knowledge, persuasion, decision, implementation, and confirmation. In every activity, there will be a communication channel to facilitate us to introduce and give an understanding about the digital workplace to employees as adopters.

##### 1. Knowledge

In this stage, we will introduce the idea of digital workplace to the decision-making unit. The decision-making unit is represented as IT manager or IT supervisor. This stage is an important state because it determines how the process will proceed and it matters because if decision-making unit is failed to receive the basic understanding about benefits and business impact of digital workplace,

they will reject to use it. According to this issue, we have to focus on how we present the idea. Moreover, we have to take concern at socioeconomics, personality variables, and communication behavior in order to identify the type of adopters. It matters to help us in choosing suitable communication channels.

Socioeconomics is about how to identify education level, income, and occupation. Moreover, personality variables are used to find personality type. At this activity, we can use five-factor model (FFM). FFM is widely known as psychology model to identify human personality. This model contains openness to experience, conscientiousness, extraversion, agreeableness, neuroticism.

After we identify employees' personality type, we can continue to check on communication behavior. It contains three characteristics; communication quality, the extent of information sharing between employees, and participation in planning and goal settings [18]. After we analyze three characteristics of decision-making unit, we can find the type of digital workplace adopter.

According to the type of adopters, we may choose communication channels to present the digital workplace. Earlier adopter will more interest in a cosmopolite mass media channel. Meanwhile, later adopter will more interest in cosmopolite interpersonal channel.

## 2. Persuasion

Persuasion stage aims to form the attitude of decision-making units toward digital workplace. After they gain some understanding about digital workplace through knowledge stage, they will more involve with the idea of the digital workplace. They will find more information about digital workplace. Table 2 shows the characteristics of the digital workplace which have to be covered. Finding the characteristics of the digital workplace as innovation is important to decrease the degree of uncertainty for individual. In this stage, we can use interpersonal channel to communicate with decision-making unit.

TABLE 2. CHARACTERISTICS OF DIGITAL WORKPLACE

Characteristics	Description
Relative Advantage	How digital workplace increasing user engagement and job satisfaction which can lead to productivity and profit organization
Compatibility	Digital workplace meets organization needs and must be compatible with existing value and system
Complexity	Digital workplace must be easy to be understood and used. Additionally, along the implementation and use, there will be many changes which come from business and technical, so digital workplace must be easy to customizable
Trialability	At the persuasion stage, the idea of digital workplace

	seems to be uncertain, to minimize the risk which will lead to rejection, we must add prototype. By using prototype, we can present and demonstrate digital workplace. Moreover, we must enable the users to try or even use it to prove the list of advantages.
Observability	As we discuss at trialability section, we enable the organization to try the prototype and understand the mechanism. It will ensure that organization are able to check on what digital workplace can do for the organization.

## 3. Decision

Organization will decide to adopt or reject the implementation of the digital workplace for their organization at decision stage. In this stage, we will use interpersonal communication channel. If the organization decides to adopt, we may prepare the requirements to implement the suggested innovation. In contrary, the rejection can be a passive and active rejection. Passive rejection is the state when the organization refuses to adopt an innovation at the first presentation of innovation. Meanwhile, the active rejection is defined as the state when the organization considers adopting the innovation but at the end organization decides to not implementing the innovation [8].

## 4. Implementation

When the organization decides to adopt digital workplace, the next step is to implement it in organization. The organization and developer must discuss IT infrastructure, configuration, standard operations, and set up a support system to ensure the digital workplace runs properly. We also need to communicate the changes which are caused by implementation of digital workplace to all employees. In this stage, we can combine interpersonal and mass media communication channel.

## 5. Confirmation

After implementing digital workplace in organization, we have to review and monitor the impact of digital workplace implementation. It will ensure that organization make a right decision. Organization can reverse the decision if they find the implementation of digital workplace has failed to boost the desired performance.

In this stage, we also propose user engagement measurement. Implementation of IT, including digital workplace, needs full participation of employees as users. We propose the use of user engagement measurement which is formulated by Heather O'Brien. Using this measurement, we will measure every attribute of user engagement.

## D. Control

This part describes about control as the element to help organization in managing, controlling, and ensuring the digital workplace diffusion is aligned to the internal and external standard. The internal standard can be

organizational standards policies and procedures while external standard can be a government's regulation.

### 1. IT Governance

We need IT governance along the implementation of the digital workplace as an innovation. IT governance helps organization to ensure the use of IT is effective, efficient, and meet its goals. IT governance enables the organization to fix organization's culture issue along with digital workplace as IT product implementation and measure IT and business performance. Digital workplace as IT product requires an enterprise-wide focus, by implementing digital workplace organization must have solution for issues which are related to business and strategic. There are many frameworks which are related to IT governance, such as COBIT, ITIL, etc. Every organization is unique, so we can discuss with the board about what kind of IT Governance that might be suitable.

### 2. Risk Management

Every project has risks and if it is being left uncertainty and ignored, it will become seeds of failures for organization. Digital workplace diffusion is a big project with high level of cost, risk management must be run to help the organization in identifying, monitoring, prioritizing, minimizing risk, formulating guide, strategy, and policy, and more important is providing a solution of risks using technology, human and organization resources. There are many frameworks for IT risk management, such as Cobit, Coso's Enterprise Risk Management (ERM), Risk Management Framework (RMF), etc.

### 3. Compliance

The implementation and operation of the digital workplace must comply to organization policy and regulation in which it is implemented. When we decided to use digital workplace, we must define all the relevant rules and regulations, such as privacy law, Data Protection Act (DPA) etc. Thereafter, those rules and regulations along with organization policy will serve as guidelines for developer to develop the digital workplace. In operation of digital workplace, we also need to monitor employee's compliance to organization policy and regulation to avoid misuse of the digital workplace.

## IV. CONCLUSION

In this proposal, diffusion theory is suggested as an approach in introducing and implementing digital workplace. We also propose the use of user engagement-centric and control. User engagement-centric helps organization to measure the degree of user involvement and acceptance to the digital workplace. Meanwhile, control which contains IT governance, risk management, and compliance help organization to align digital workplace and its business, evaluate, and monitor the activities in the digital workplace. Further research of this proposal is the

validation of the model and the impact of digital workplace to organization culture.

## REFERENCES

- [1] N.Dotson, Building a Better Digital Workplace., San Fransisco, CA, CMSWire.
- [2] D.Lavenda, "What Gartner Wants You to Know About the New Digital Workplace." Internet : <http://www.cmswire.com/social-business/what-gartner-wants-you-to-know-about-the-new-digital-workplace/>, May 28, 2015 [ Sep. 5, 2015].
- [3] M.I.Hwang and R.G.Thorn, "The effect of user engagement on system success: a meta-analytical integration of research findings." *Information and Management Journal*, vol.35, pp.229-336, Apr.1999.
- [4] J. Mcconnell, "Digital Workplace - Trends and Transformation," Washington D.C, 2013.
- [5] F. Herrera et al, "The digital workplace: Think, share, do,"Deloitte, Canada, 2011.
- [6] M.White,"Digital workplaces: Vision and Reality".*Business Information Review*, vol.29, 205-214, Des.2012
- [7] M.S. Elliott and K.L. Kraemer. Computerization Movements and Technology Diffusion: From Mainframes to Ubiquitous Computing. New Jersey: American society for Information Science and Technology. 2008.
- [8] E.M.Rogers. *Diffusion of Innovations*. New York: Free Press, 2003.
- [9] R.B. Tucker. Innovation is Everybody's Business: How to Make Yourself Indispensable in Today's Hypercompetitive World.Hoboken, NJ: John Wiley & Sons, 2011, pp.12-13.
- [10] J.Lehmann, M.Lalmas, E. Yom-Tov, G.Dupret,"Model of User Engagement," in *UMAP'12 Proceedings of the 20th international conference on User Modeling, Adaptation, and Personalization*, Montreal, CA, 2012, pp.164-175.
- [11] B.Laurel, *Computer as Theater*. Boston, MA: Addison-Wesley Longman, 1993.
- [12] H.L.O'Brien and E.G.Toms,"The Development and Evaluation of a Survey to Measure User Engagement," *Journal of the American Society for Information Science and Technology*, vol.61, pp. 50-69, Jan 2010.
- [13] M.Jennings, "Theory and models for creating engaging and immersive e- commerce websites," in *SIGCPR '00 Proceedings of the 2000 ACM SIGCPR conference on Computer Personnel Research*, New York, USA, 2000, pp. 77-85.
- [14] R.Hunicke, M. LeBlanc, R.Zubek, "MDA: A Formal Approach to Game Design and Game Research," in *Proceedings of the 2004 AAAI Workshop on Challenges in Game Artificial Intelligence*, San Jose, USA, 2004.
- [15] O.Eliav and T. Sharon, "Usability in Israel," in *Global Usability*, I.Douglas and L.Zhengjie, Eds.London: Springer, 2011, pp.169-194.
- [16] Y.Hung, W.Li, Y.S Goh,"Integration of Characteristics of Culture into Product Design: A Perspective from Symbolic Interactions,"in*Cross-Cultural Design, Methods, Practice, and Case Studies*, vol. 8023.P.L.P.Rau, Ed. Berlin: Springer,2013, pp.208-217.
- [17] R.L.Celsi and J.C.Olson."The Role of Involvement in Attention and Comprehension Processes." *Journal of Consumer Research*, vol.15, pp.210-224, Sep.1988.
- [18]J. J.Mohr and R.E.Spekman, "Characteristics of Partnership Success : Partnership Attributes, Communication Behavior, and Conflict Resolution Techniques." *Strategic Management Journal*, vol.15,pp.135-152, Feb.1994